4/27/85
K.Y

WORK PLAN
RI
REILLY TAR SITE
ST. LOUIS PARK, MINNESOTA
EPA 156.5L06
April 27, 1985

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EXECUTIVE SUMMARY

This work plan was prepared and submitted as a requirement of the REM/FIT contract for remedial planning at uncontrolled waste sites. The project team assembled to execute the tasks identified in this work plan includes personnel from three firms: CH2M HILL, Polytech, Inc., and Barr Engineering Co. Polytech together with their subcontractor, Barr Engineering Co., will have lead responsibility for the Remedial Investigation. CH2M HILL has overall project responsibility. All three firms will be involved throughout the project.

The Remedial Investigation will be carried out in four separate tasks:

- Task 1 involves developing the support structure necessary to carry out the Remedial Investigation. As part of this task, the project team will be assembled and the goals and objectives of the study will be identified. Site specific quality assurance, health and safety, scope of work, and sampling plans will also be developed at this stage.

- In Task 2, groundwater contamination will be investigated by constructing 18 monitoring wells. Five will be constructed in the drift aquifer, five in the Platteville, five in the St. Peter sandstone and three in the Prairie du Chien. Two rounds of samples will be taken and analyzed for PAH and phenolic compounds.

- In Task 3, the results of the Remedial Investigation will be presented in a draft and later a final report.

- Task 4, Project Management, is an ongoing activity throughout the Remedial Investigation.

The Remedial Investigation is expected to run for approximately 32 weeks and will cost approximately $516,000.

INTRODUCTION

This work plan was prepared by CH2M HILL to define the scope and the associated costs of activities necessary to carry out the work assignment (WA), Remedial Investigation and Feasibility Study (RI/FS) for the Reilly Tar site in St. Louis Park, Minnesota. Requirements of the WA and and the CH2M HILL Zone II REM/FIT Manage ment Plan have been incorporated into this plan. The work plan includes an overall project schedule as well as detailed estimates of the number of manhours, cost, and length of time required to complete each task.

Roles of Firms

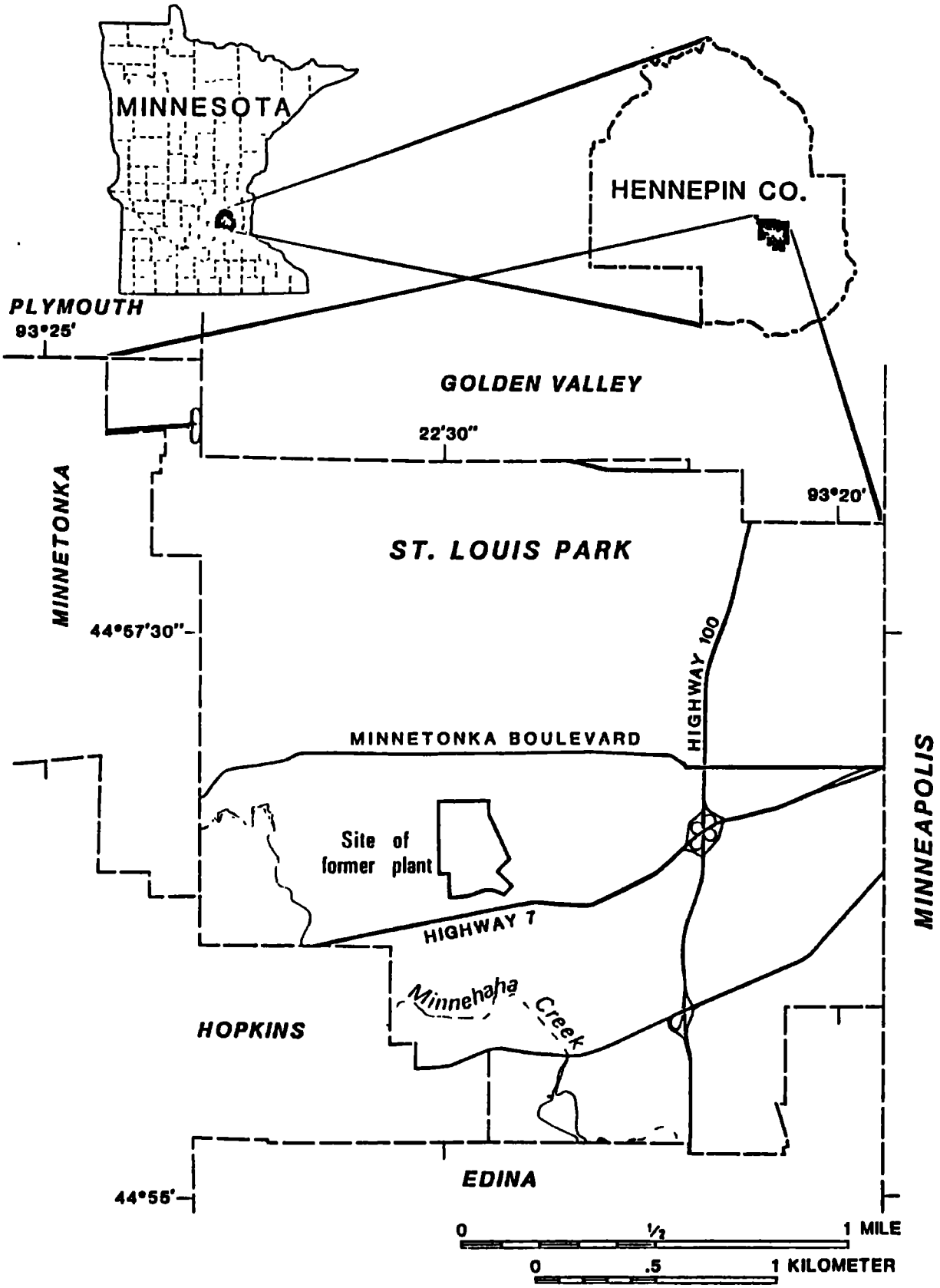
Polytech/Barr will be the principal investigator for the Remedial Investigation. CH2M HILL will provide quality assurance during the entire project and will have responsibility for contact and coordination with the U.S. EPA.

Objectives

The objectives of the Remedial Investigation recommended for the Reilly Tar site are to investigate groundwater contamination east and south (downgradient) of the site. The RI will assess the extent and degree of contamination, both vertically and horizontally, at locations not previously studied.

Background (Adapted from May 1984 R.O.D.)

The Reilly Tar and Chemical Company site occupied 80 acres of land located in St. Louis Park, Minnesota. Location and site maps are attached as Figures 1 and 2. The plant site, called the Republic Creosote Works, was located west of Gorham, Republic and Louisiana Avenues, south of 32nd Street, east of Pennsylvania Avenue, and north of Walker Street. The company no longer owns the



(From USGS Water Supply Paper 2211)

FIGURE 1
LOCATION MAP
REILLY TAR SITE

NON-RESPONSIVE

BEDROCK VALLEY

FIGURE 2
SITE MAP
REILLY TAR SITE

land; the City of St. Louis Park purchased the land from Reilly in 1972 and it is currently owned by the St. Louis Park Housing and Redevelopment Authority. Currently, the site is a park with a portion of it developed with condominiums. It is located in the midst of a residential area with some small industry.

From 1918 to 1972, the company operated a coal-tar distillation facility and wood preserving plant. Its primary production was creosote. The chemical compounds associated with this process are polynuclear aromatic hydrocarbons (PAH) and phenolics. Many of these compounds pose health risks and some are carcinogenic. The release to the environment of these compounds occurred during the coal distillation process and from materials stored on the site. The materials were apparently dumped into a well, referred to as W-23, which penetrated to the Mt. Simon/Hinckley Aquifer, a depth of about 900 feet. The well was cleaned out by the MInnesota Pollution Control Agency (MPCA) to a depth of 866 feet. Coal-tar was removed down to a depth of 740 feet. Evidence of contamination of the Mt. Simon/Hinckley Aquifer has not been found at this time. Wastes containing coal-tar and its distillation by-products were discharged, as a matter of disposal practice, overland into ditches that emptied into a peat bog south of the site. This practice, according to Reilly, occurred from 1917 to 1939. In 1940 and 1941, Reilly installed a wastewater treatment plant and discharged the effluent into the bog south of the site. The values of both phenolics and oil and grease in the discharge water varied typically from 100 to 1,000 milligrams per liter. This discharge continued for the duration of Reilly's operation. The peat bog has retained contamination that was discharged over the years and is now a source of groundwater contamination.

In 1972, the plant was dismantled and the land sold to the City of St. Louis Park. In 1973, a stormwater runoff collection system was built which fed into a lined pond on the site. The pond on the site discharges into a drain which is routed to another pond off-site before it eventually discharges into Minnehaha Creek. The

City of St. Louis Park (SLP) monitors the discharge into the creek.

Construction of a block of condominiums on the northern part of the site began in 1976. At this time, no further construction is underway, although plans for new development of the site are pending by the Housing and Redevelopment Authority. All excavated material is inspected by the State and disposed if found contaminated.

The City of St. Louis Park drilled its first municipal well, W-112, in 1932. The well, drilled to the Prairie du Chein-Jordan Aquifer, was closed within two weeks of its start-up because of bad taste and odors. Several private wells near the plant site also exhibited contamination in water drawn from the Drift/Platteville Aquifer, during the 1930's and 1940's. Municipal wells continued to be constructed into the Prairie du Chien-Jordan Aquifer, further away from the Reilly site.

In the later 1970's, the MDH began using a more sensitive method of PAH analysis using High Performance Liquid Chromatography. As a result, St. Louis Park Wells SLP 10, SLP 15, SLP7, SLP9, SLP4, and SLP 5 were closed due to elevated concentrations of PAH. In March 1981, a City of Hopkins well, H-3 was also closed. The City of St. Louis Park lost about 35 percent of its water production capacity due to the closure of the six wells. Although the City instituted a water conservation program and drilled a new well, SLP 17, to the deeper Mt. Simon-Hinckley aquifer, the City still falls substantially short of peak water supply needs during the summer months.

In August 1981, the MPCA was awarded a cooperative agreement to investigate Well W-23 and to perform a feasiblity study for restoration of drinking water. In accordance with the May 1984 Record of Decision, GAC filtration was authorized for SLP 10 and SLP 15. In December 1982, a second cooperative agreement was

awarded to the MPCA. That agreement provided for abandonment of multi-aquifer wells and a feasibility study for the control of source in the bog and on the site. This work was delayed while feasibility work accomplished by Reilly Tar through its consultants was conducted.

The second agreement also was to model and test proposed Prairie du Chein/Jordan gradient control well systems and determine the extent of contamination. The work proposed herein will address, in part, the latter concern.

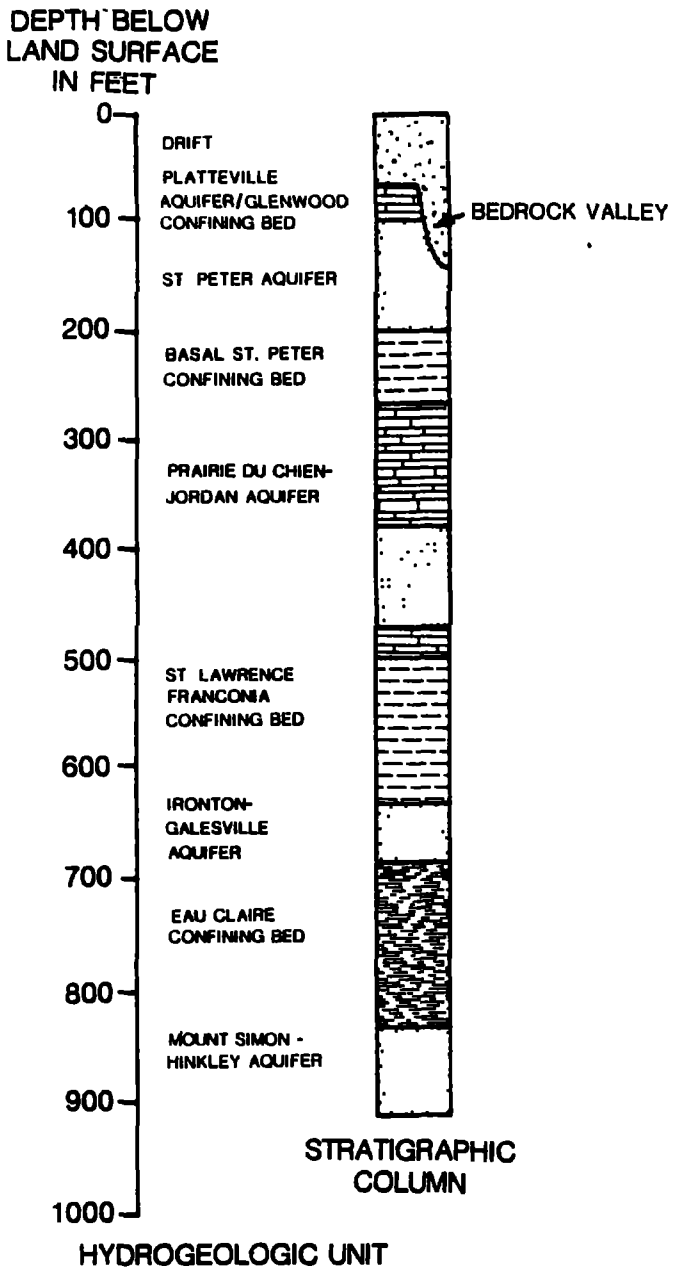
Coal-tar released from the site has contaminated four aquifers located beneath the site (see Table 1 and Figures 3 and 4. The aquifers that are being studied under the current cooperative agreement with the EPA and MPCA include:

TABLE 1

HYDROGEOLOGY BELOW REILLY TAR

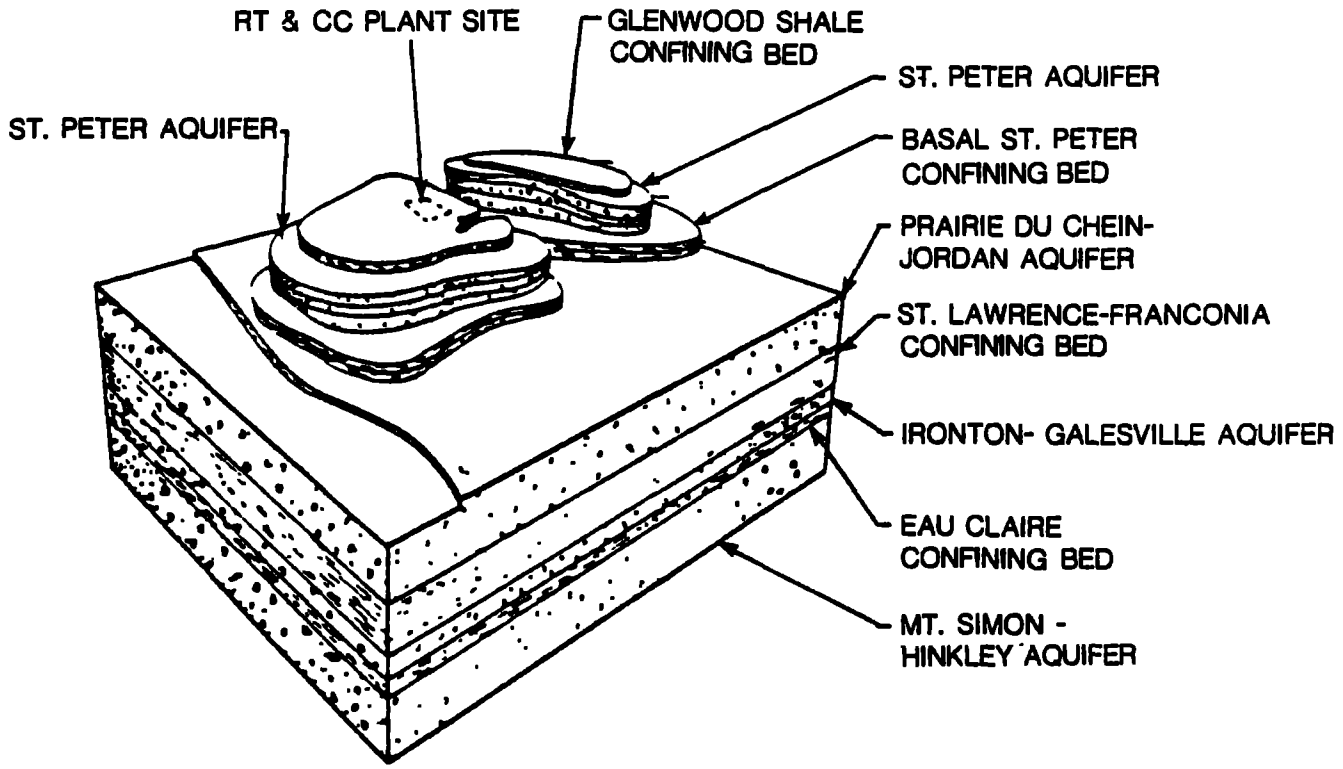
Aquifer	Approx. Depth (ft.)	Use	Upper Range of Contam. (Total PAHs)
1. Drift/ Platteville	0-90	Private/ Industrial Wells	1000 ug/L off-site
2. St. Peter	90-200	Municipal/Private drinking water wells	10 ug/L off-site
3. Prairie du Chien-Jordan	250-500	Municipal drinking water wells	10 ug/L off-site
4. Ironton-Galesville	700-750	Industrial usage	10 ug/L is estimated to be on-site
5. Mt. Simon-Hinckley	800-1100	Municipal drinking water wells	Not detected

Groundwater contamination in each aquifer under the site is approximately ten times higher than the off-site concentration shown in Table 1. Available data has been collected from existing wells shown in the site map, Figure 2.



(Illustration Modified From Record of Decision, May 25, 1984.)

FIGURE 3
STRATIGRAPHIC PROFILE
REILLY TAR SITE



(Illustration From Record of Decision, May 25, 1984.)

FIGURE 4
GEOLOGY BENEATH DRIFT-PLATTEVILLE AQUIFER
REILLY TAR SITE

REMEDIAL INVESTIGATION (RI)

Task 1 -- Investigation Support/Work Plan Preparation

The purpose of this task is to refine the scope of work for the RI as presented in the work assignment, develop a schedule to imple ment the work plan, and develop a cost estimate. The schedule for the project is presented in Figure 7.

Subtask 1.1 -- Prepare Quality Assurance Plan

A site specific Quality Assurance Project Plan (QAPP) for field investigation activities will be developed by CH2M HILL. The plan will include any needs specific to the work assignment as well as any additional requirements requested by the U.S. EPA due to extraordinary project requirements. Copies of the QAPP will be provided to appropriate U.S. EPA personnel for approval prior to sample collection.

Subtask 1.2 -- Prepare Site Health and Safety Plan

A site specific Health and Safety Plan will be developed by Polytech/Barr based on a review of health and safety plans from prior site operations. The plan will indicate the type of protective gear site personnel should wear to minimize their exposure (either through inhalation or direct contact) to hazardous materials on the site. The level of protection required may vary with the type and location of field testing being conducted. The Health and Safety Plan will also describe possible physical hazards that the field team and nearby workers and residents may face; decontamination procedures; an emergency response plan; the work schedule; and any on-site monitoring requirements including action levels for evacuation of an area of the site or the entire site. Modifications of this plan may be made as additional data are gathered during subsequent site visits. Copies of the plan will be

provided to appropriate U.S. EPA personnel for approval. The plan will consider the Interim Standard Operating Safety Guidelines.

Subtask 1.3 -- Prepare Site Sampling Plan

A Sampling Plan will be developed addressing well installation and groundwater sampling to be conducted. The Sampling Plan will incorporate material from the site Quality Assurance Project Plan developed in Subtask 1.1 and the work plan developed in Subtask 1.4. The plan will be approved by U.S. EPA and will include discussions of:

- types of samples to be taken;
- sampling equipment required including containers to be used and methods of sample preservation;
- site specific sampling methodology including decontamination requirements;
- number of samples to be taken and analytical procedures to be used;
- sample numbering system;
- sample storage and shipping methods;
- documentation of sampling and chain of custody procedures;
- estimated duration of sampling;
- allocation of personnel resources;
- agency roles.

After incorporation of review comments, copies of the Final Sampling Plan will be distributed to appropriate personnel.

Subtask 1.4 -- Prepare Work Plan

This Final Work Plan will be prepared using the work assignment, the Zone II REM/FIT Management Plan, review of data from previous phases of investigation, and discussions with MPCA, U.S.G.S. and EPA. It will be in accordance with the requirements of the Zone II REM/FIT Management Plan.

Task 2 -- Groundwater Contamination Investigation

The purpose of this task is to assess the degree of contamination in the Drift/Platteville and St. Peter Aquifers and, to the extent possible, determine the areal extent of contamination in those aquifers.

Subtask 2.1 -- Selection of Monitoring Well Installation Locations

Prior to beginning Task 2, a visit to the site will be made to determine the exact locations where additional monitoring wells will be placed. This site visit will be a cooperative effort, involving all appropriate agenty and state personnel. It is anticipated that representatives from Polytech/Barr, U.S. EPA, U.S.G.S and MPCA will be present. The results of this site visit will be documented and made available to appropriate project team and agency personnel. Preliminary monitoring well locations are shown in Figure 5.

The need for three Prairie du Chien wells will be evaluated. If existing wells can be found for sampling, and those wells can be documented as to their contruction and suitability, it may be possible to do without some of the proposed Prairie du Chien wells.

Subtask 2.2 -- Monitoring Well Installation

The objective of this task is to obtain information on the degree and areal extent of contamination in the Drift/Platteville, St. Peter and Frairie de Chien aquifers. The expanded groundwater monitoring well network installed during this task will:

- o produce hydrogeologic data needed to evaluate groundwater flow conditions

- o help to detect if any contaminants have migrated into these units, monitor future movement of any contaminant plume, and assess the results of potential future remedial actions.

Five wells be constructed in the drift, five in the Platteville and five in the St. Peter. Three Prairie du Chien wells are anticipated.

Monitoring Well Installation

All boreholes will be drilled using cable tool drilling methods. Although this method is slower, it has been selected because it offers the opportunity to sample during drilling if field conditions suggested that procedure was desirable, it provides better definition of stratigraphy during drilling, it does not have potential problems with drilling mud interferring with development and sampling or being lost in the carbonate aquifers, and it provides easiest decontamination between wells and formations. The air rotary method is not competitively available locally and is not recommended in the sampling zone. Wells will be installed in the middle drift, the Platteville Limestone, St. Peter Sandstone and the Prairie du Chien group. Because of the highly contaminated nature of the upper aquifer in the vicinity of the Reilly Tar and Chemical site, it is a requirement that any well being constructed through this contaminated area be grouted off in

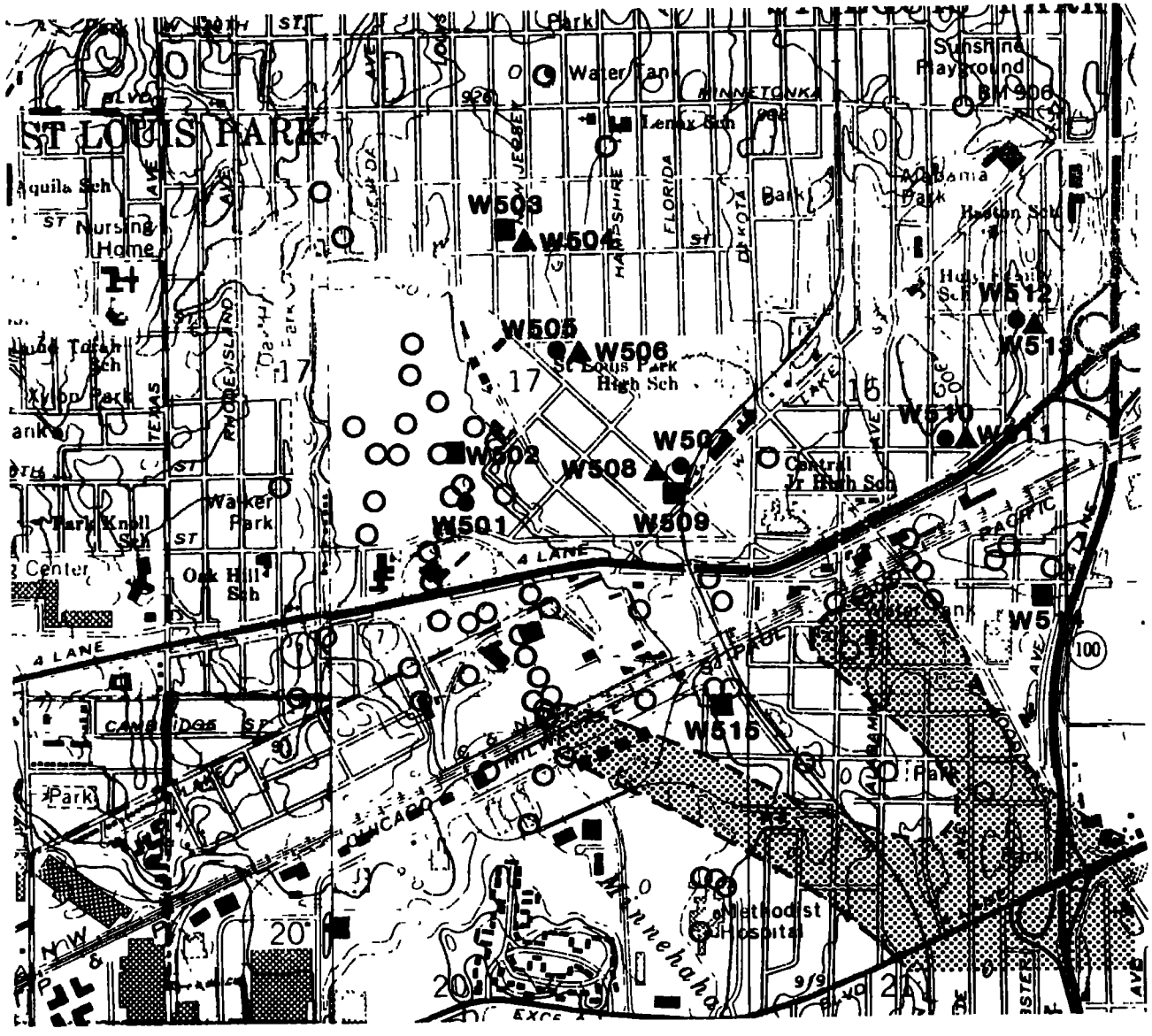
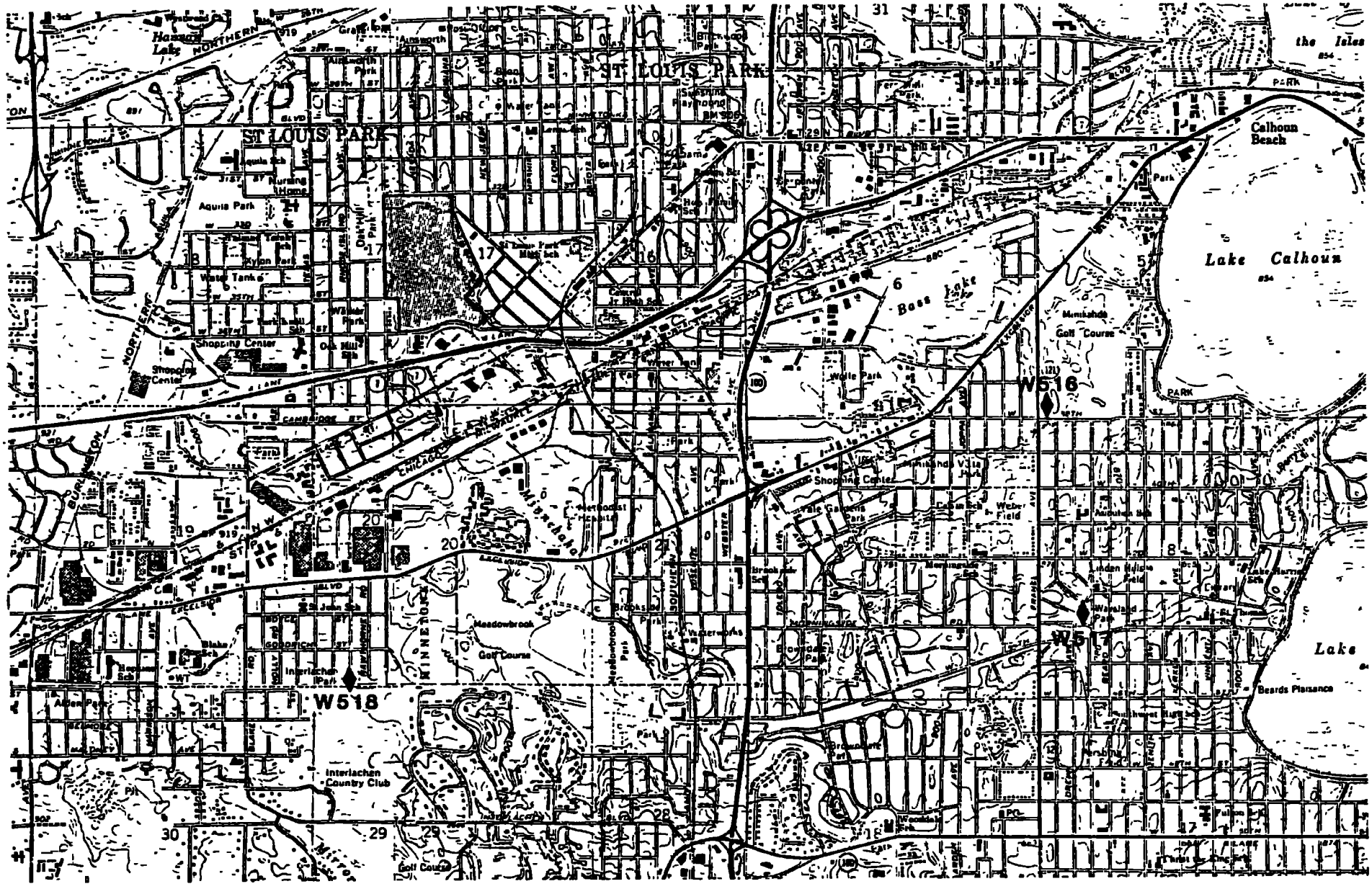


FIGURE 5A
PROPOSED MONITORING WELL NETWORK
REILLY TAR SITE



♦ PROPOSED PRAIRIE DU CHIEN WELLS

FIGURE 5B
PROPOSED MONITORING WELL NETWORK
REILLY TAR SITE

the till layer immediately below the upper aquifer. Because of this, the wells will be multiple casing wells. The following paragraphs describe in detail the construction methods to be used to construct the three types of wells. Figure 6 illustrates the anticipated construction techniques.

Middle Drift Aquifer Monitoring Wells -- The middle drift monitoring wells will be constructed so that the entire saturated thickness of the middle drift can be monitored. To accomplish this, an 8-inch steel pipe will be driven by cable tool advancement methods a minimum of 10 feet into the till below the upper aquifer. A 4-inch diameter steel pipe will be driven, using cable tool methods, inside of the casing through the entire length of the middle drift. A 4-inch telescoping screen will then be placed on the inside of the 4-inch casing and the 4-inch casing pulled back exposing the screen throughout the middle drift. The annulus between the 4-inch and the 8-inch casing will be backfilled with filter material to the base of the 8-inch casing. The annulus between the 4-inch and the 8-inch casing will then be pressure grouted with neat cement grout from the base of the 8-inch casing to the surface by using a tremie pipe whose discharge end is below the surface of the grout. A permanent lead packer will be used to prevent sand from washing into the casing between the screen and the 4-inch black steel riser pipe.

Platteville Limestone Monitoring Wells -- To construct monitoring wells in the Platteville Limestone, an 8-inch diameter steel pipe will be advanced by cable tool methods through the upper aquifer and into a minimum of at least 10 feet into the till layer. Then a 4-inch diameter steel pipe will be driven through the middle and basal drifts and set approximately 2 feet into competent limestone. The annulus between the 4-inch and the 8-inch steel pipes will then be grouted with neat cement grout using the methods described above. The Platteville Limestone will be drilled (open hole-nominal 3-7/8 inch hole) by cable tool methods to complete the monitoring well.

St. Peter Sandstone Monitoring Wells -- To construct the St. Peter monitoring wells, a 14-inch diameter steel pipe will be placed at least 10 feet into the till below the upper aquifer. An 8-inch diameter steel pipe will be driven through the middle and the basal drifts and advanced through the Platteville Limestone into the Glenwood Shale immediately below the Platteville. The annulus between the 14-inch and 8-inch will be grouted to the surface with neat cement grout using the methods described above. Then a 7 7/8-inch open hole will be cable tooled to a depth of approximately 20 feet into the St. Peter Sandstone and a 20 foot length of 4-inch diameter screen and riser will be installed. The base plate of the screen will be removed if the hole collapses and the screen cannot be placed to proper depth. Then the screen and riser will be placed to depth by bailing from inside the assembly. A lead base plate will then be placed and set. The annulus between the 4-inch and 8-inch riser pipe will then be grouted to the surface with neat cement grout using the methods described above.

Prairie du Chien Group Monitoring Wells -- To construct the Prairie du Chien monitoring wells, a 14-inch diameter steel pipe will be placed at least 10 feet into the till below the upper aquifer. An 8-inch diameter steel pipe will be driven through the Platteville Limestone into the Glenwood Shale immediately below the Platteville. The annulus between the 14-inch and the 8-inch steel pipes will be grouted to the surface with neat cement grout using the methods described above. Then a 4-inch steel pipe will be driven through the St. Peter Sandstone aquifer into the Basal St. Peter confining bed. The annulus between the 8-inch and the 4-inch steel pipes will be grouted to the surface with neat cement grout using the methods described above. The Priarie du Chien Group will be drilled (open hole-nominal 3 7/8-inch hole) by cable tool methods to complete the monitoring well.

During installation, development and monitoring of the wells at the Reilly Tar site, the following procedures and practices will be observed:

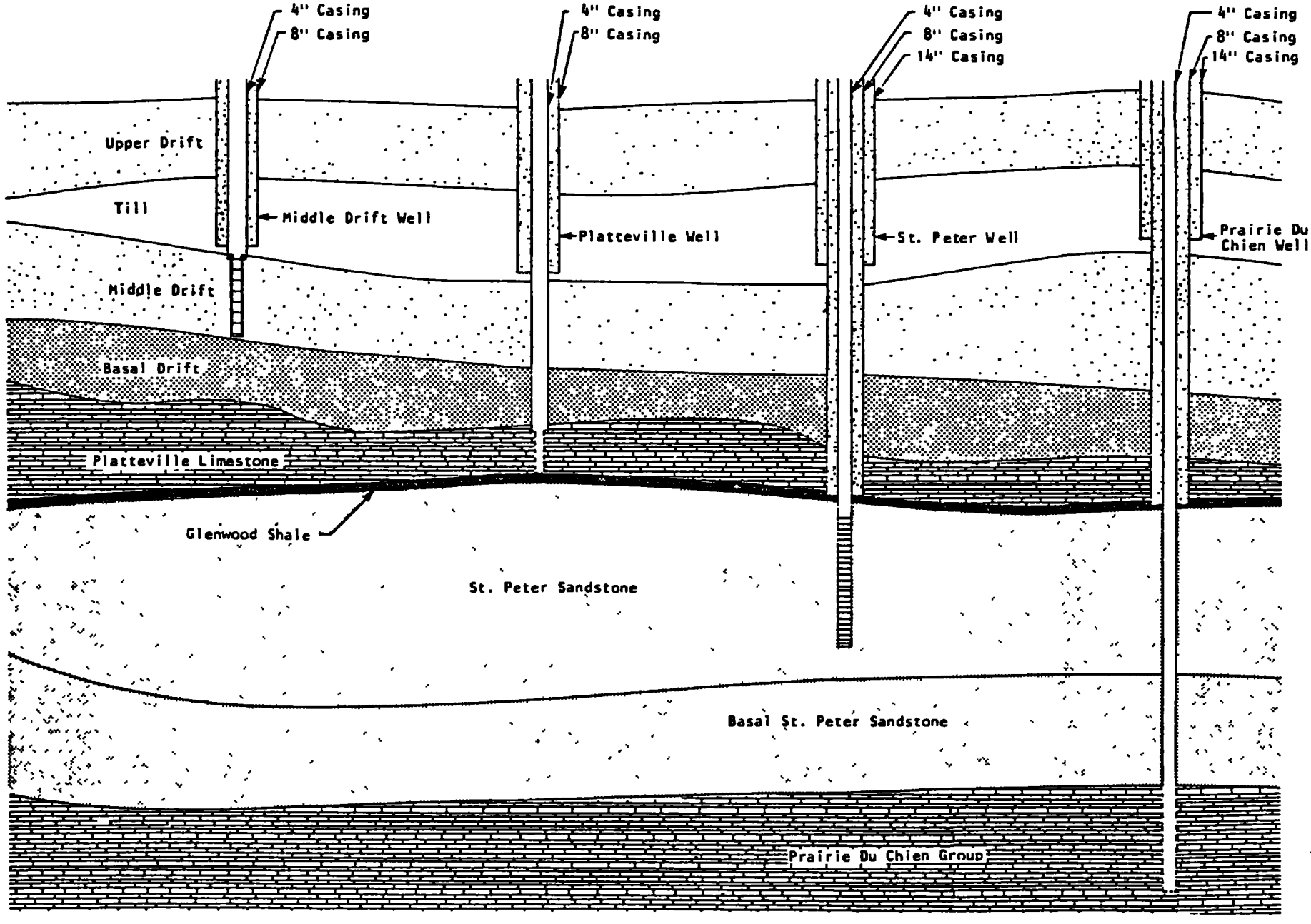


FIGURE 6
TYPICAL WELL CONSTRUCTION
REILLY TAR SITE

- all necessary permits required for installation of monitoring wells (as per MDH regulations) will be obtained prior to arriving on-site;

- drilling tools, sampling equipment, and drill rigs will be steam cleaned prior to entering the site;

- all pipe to be used for well installation will be steam cleaned on-site prior to well construction;

- drilling tools and equipment will be decontaminated between each boring;

- all soil samplers will be decontaminated between each use;

- all drill cuttings will be contained in a secure area for future disposal and all water used for drilling and all used decontamination solution will be discharged to the sanitary sewer;

- all wells will be constructed, finished and developed as described above.

The schedule and cost estimates for Subtask 2.2 are based on the following assumptions:

- installation of 18 additional monitoring wells as described above;

- all drill cuttings will be contained in a secured area on-site;

- one steam-cleaning unit will be provided for each rig used by the drilling subcontractor;

- o three drill rigs will be used;
- o Level D Health and Safety protection will be required for drilling;
- o static head measurements will be taken twice;
- o all drilling will be performed by a Barr subcontractor;
- o 12 weeks will be required to complete well installation, assuming drilling contractors can start immediately.

Subtask 2.3 -- Groundwater Sampling and Analysis

Groundwater sampling will be carried out in three phases and is summarized in Table 2 and 3. Twenty-eight existing wells will be sampled furing Phase I, the 18 new wells during Phase II and forty-six groundwater samples will be collected during Phase III (28 from existing wells and 18 from wells installed in Subtask 2.2) for a total of 92 investigative samples. Twenty additional quality control samples will be taken. Monitoring well samples will be analyzed for:

- o temperature (field);
- o pH (field);
- o dissolved oxygen (field);
- o specific conductance (field);
- o Those compounds summarized in Table 4.

Phase I sampling will occur in two weeks. Phase II will occur as soon as possible after all wells are installed. Phase III will occur if necessary after all laboratory analytical results are

TABLE 2

SUMMARY OF WELLS SAMPLED

	Formation/ Size, Inches	
Well	Od	Opl
W2	4"	
W5	4"	
W11	4"	
W12	4"	
W16	4"	
W116	4"	
W117	4"	
W128	4"	
W135	4"	
W136	4"	
PB140	?	
P111	1¼"	
W1		4"
W19		4"
W20		4"
W22		4"
W115		4"
W120		4"
W121		4"
W123		4"
W130		4"

	Formation/ Size, Inches			
Well	Od	Opl	Osp	Opc
W131		4"		
W132		4"		
W143		4"		
W24			4"	
W122			4"	
W129			4"	
P116			1¼"	
W501	4"			
W502			4"	
W503			4"	
W504		4"		
W505	4"			
W506		4"		
W507	4"			
W508		4"		
W509			4"	
W510	4"			
W511		4"		
W512	4"			
W513		4"		
W514			4"	
W515			4"	
W516				4"
W517				4"
W518				4"

1. Formations:
   - Qd = Drift
   - Opl = Platteville
   - Osp = St. Peter
   - Opc = Prairie du Chien

TABLE 3

SUMMARY OF SAMPLE COLLECTION & ANALYSIS

REILLY TAR SITE

Groundwater Sampling	Wells Sampled	Replicates	Blanks	PAH (ppt) Analysis only[b]	HSL organics, and inorganics and others[a]	Field pH Temp., D.O. and conductivity
Phase I	28	3	3	0	34	28
Phase II	18	2	2	3	19	18
Phase III	46	5	5	3	53	46
Total	92	10	10	6	106	92

a. Analysis for parameters in table 4.

b. Prairie du Chien wells analyzed only for base neutrals.

TABLE 4

COMPOUNDS ANALYZED

Volatile Compounds

Chloromethane
Vinyl Chloride
Methylene Chloride
Carbon Disulfide
1,1-Dichloroethane
Chloroform
2-Butanone
Carbon Tetrachloride
Bromodichloromethane
1,2-Dichloropropane
Trichloroethene
1,1,2-Trichloroethane
cis-1,3-Dichloropropene
Bromoform
4-Methyl-2-pentanone
Toluene
Ethyl Benzene
Total Xylenes
Bromomethane
Chloroethane
Acetone
1,1-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloroethane
1,1,1-Trichloroethane
Vinyl Acetate
1,1,2,2-Tetrachloroethane
trans-1,3-Dichloropropene
Dibromochloromethane
Benzene
2-Chloroethyl Vinyl Ether
2-Hexanone
Tetrachloroethene
Chlorobenzene
Styrene

Semi-Volatile Compounds

N-Nitrosodimethylamine
bis(2-Chloroethyl)ether
1,4-Dichlorobenzene
1,2-Dichlorobenzene
Di-n-octyl Phthalate
Hexachloroethane
Isophorone
bis(2-Chloroethoxy)methane
4-Chloroaniline
Hexachlorocyclopentadiene
2-Chloronaphthalene
Dimethyl Phthalate
2,4-Dinitrotoluene
Diethylphthalate
4-Nitroaniline
4-Bromophenyl Phenyl Ether
Di-n-butylphthalate
Butyl Benzyl Phthalate
bis(2-ethylhexyl)phthalate
Aniline
1,3-Dichlorobenzene
Benzyl Alcohol
bis(2-Chloroisopropyl)ether
N-Nitroso-dipropylamine
Nitrobenzene
Benzoic Acid
1,2,4-Trichlorobenzene
Hexachlorobutadiene
2,4,5-Trichlorophenol
2-Nitroaniline
3-Nitroaniline
2,6-Dinitrotoluene
4-Chlorophenyl Phenyl Ether
N-nitrosodiphenylamine
Hexachlorobenzene
Benzidine
3,3'-Dichlorobenzidine

TABLE 4 (cont.)

COMPOUNDS ANALYZED

Base Neutral Compounds

PAH and Heterocyles - Carcenogenic

Benzo(a)anthracene
Chrysene
Benzo(b)fluoranthene
Benzo(a)pyrene
Indeno(1,2,3,cd)pyrene
Dibenz(ah)anthracene
Benzo(ghi)perylene
Quinoline (Benzo(b)pyridine)

PAH and Heterocycles - Non-Carcenohenic

2,3-Benzofuran
2,3-Dihydroindene
Benzo(e)pyrene
Indene
Naphthalene
Triphenylene
Benzo(k)fluoranthene
Benzo(b)thiophene
Isoquinoline
Indole
2-Methylnaphthalene
1-Methylnaphthalene
Biphenyl
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene
Dibenzothiophene
Phenanthrene
Anthracene
Acridine
Phenanthridine
Carbazole
Fluoranthene
Pyrene
7,12-Dimethylbenz(a)anthracene
Perylene
3-Methylcholanthrene

Acid Compounds

Phenolics

Phenol
2-Chlorophenol
2-Nitrophenol
2,4-Dimethylphenol
2,4-Dichlorophenol
4-Chloro-3-methylphenol
2,4,6-Trichlorophenol
2,4-Dinitrophenol
4-Nitrophenol
2-Methyl-4,6-dinitrophenol
Pentachlorophenol
o-Cresol (2-Methylphenol)
m-Cresol (3-Methylphenol)
p-Cresol (4-Methylphenol)

Inorganic Compounds

Metals

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Tin
Vanadium
Zinc

TABLE 4 (cont.)

COMPOUNDS ANALYZED

Inorganic Compounds

Other Parameters

Chloride
Ammonia
Nitrate - Nitrite
Sulfate
Total Organic Carbon
Total Kjeldahl Nitrogen
Alkalinity
Total Phenolics (MBTH)

reviewed from Phase I and III samples. Sampling will be performed in Level D.

Task 3 -- Remedial Investigation Report

A Draft Remedial Investigation Report will be prepared consolidating and summarizing the data and documentation of the remedial investigation. Included will be well logs, sampling results and other information obtained during the RI pertinent to the FS. This report will be submitted to the U.S. EPA for review. Barr has lead reponsibility for all aspects of this task.

Following the receipt of comments, a final report incorporating the comments will be prepared and submitted for U.S. EPA approval.

Task 4 -- Project Management

The Site Project Manager is responsible for budget and schedule control, work product quality, and both technical and financial reporting. The Site Project Manager will be assisted in these duties by a staff of senior reviewers and others. CH2M HILL has lead responsibility for all aspects of this task.

Activities to be performed in this task include:

- communicating with U.S. EPA, MPCA and local officials;
- selecting, coordinating and scheduling staff for the work assignment;
- obtaining and coordinating senior reviewers;
- controlling budgets and schedules and notifying U.S. EPA of cost overruns ahead of schedule as much as feasibly possible;

- monitoring subcontractors;

- establishing project records;

- submitting monthly technical, management and financial information;

- submitting monthly technical and financial reports, activity completion reports, award fee performance event reports, and task completion.

Cost control procedures will include designating unique project task numbers to track task costs versus budget, in comparison with task element status. Overall completion status will be developed from individual task element budget comparison.

SCHEDULE AND BUDGET

Tables 2 and 3 summarizes the wells to be sampled for analysis. Budgets for each of the firms on the project team are shown in Tables 5, 6 and 7). The total project is expected to take 32 weeks to complete. The proposed project schedule is presented in Figure 7.

The following assumptions have been made during the formulation of the proposed project schedule and budget:

- the zero start date for the project is assumed to be April 8, 1985

- U.S. EPA personnel will respond to draft submittals in approximately 1 week

- Level D protection will be required for all drilling and other on-site activities

- all nondisposable health and safety items and field sampling equipment used during the project will be supplied by the REM/FIT contractor or its subcontractors.

Table 5
CH2M HILL ESTIMATED PROJECT COST SUMMARY
Reilly Tar Site

TASK		1.0 - Investigation Support/ Work Plan Preparation				2.0 - Groundwater Contamination Investigation			3.0	4.0	
SUBTASK		1.1 QAPP	1.2 Safety Plan	1.3 Sampling Plan	1.4 Work Plan	2.1 Locate Wells	2.2 Install Wells	2.3 Sample Wells	Remedial Invest Report	Project Management	TOTAL
LABOR (HOURS)											
P4		0	0	0	0	0	0	0	0	20	20
P3		24	4	20	40	0	0	16	40	40	184
P2		40	0	0	0	0	0	0	0	0	40
P1		0	0	0	0	0	0	0	0	0	0
T2		0	0	0	0	0	0	0	0	0	0
T1		0	0	0	0	0	0	0	0	0	0
O		8	0	8	8	0	0	0	16	8	48
TOTAL HOURS LABOR		72	4	28	48	0	0	16	56	68	292
DIRECT LABOR COST	1985 RATE										
P4	25.27	0	0	0	0	0	0	0	0	505	505
P3	17.91	430	72	358	716	0	0	287	716	716	3295
P2	15.18	607	0	0	0	0	0	0	0	0	607
P1	13.07	0	0	0	0	0	0	0	0	0	0
T2	13.07	0	0	0	0	0	0	0	0	0	0
T1	8.91	0	0	0	0	0	0	0	0	0	0
O	8.37	67	0	67	67	0	0	0	134	67	402
TOTAL DIRECT LABOR COST		1104	72	425	783	0	0	287	850	1289	4810
OVERHEAD	0.41	453	29	174	321	0	0	117	349	528	1972
G & A OVERHEAD	1.22	1347	87	519	956	0	0	350	1037	1572	5868
TOTAL LABOR COST		2904	188	1118	2060	0	0	754	2236	3389	12650
EXPENSE ITEMS											
TRANSPORTATION		0	0	0	350	0	0	450	0	300	1100
SUBSISTENCE		0	0	0	20	0	0	60	0	50	130
PRINTING		100	0	0	100	0	0	0	200	0	400
SHIPPING		0	0	0	20	0	0	0	0	0	20
LABORATORY		0	0	0	0	0	0	156248	0	0	156248
TOTAL EXPENSE COST		100	0	0	490	0	0	156758	200	350	157898
SUBTOTAL LABOR AND EXPENSES		3004	188	1118	2550	0	0	157512	2436	3739	170548
SUBCONTRACTS											
A/E CONSULTANTS		0	565	1143	7616	1241	251598	37992	4503	8063	312721
TOTAL SUBCONTRACTS		0	565	1143	7616	1241	251598	37992	4503	8063	312721
FEE											
LABOR & EXPENSES	0.10	300	19	112	255	0	0	15751	244	374	17055
SUBCONTRACTS	0.05	0	28	57	381	62	12580	1900	225	403	15636
TOTAL FEE		300	47	169	636	62	12580	17651	469	777	32691
TOTAL SUBTASK COST		3304	801	2430	10802	1303	264178	213154	7408	12580	515960

Table 6
POLYTECH ESTIMATED PROJECT COST SUMMARY
Reilly Tar Site

TASK		1.0 - Investigation Support/ Work Plan Preparation				2.0 - Groundwater Contamination Investigation			3.0	4.0	
SUBTASK		1.1 QAPP	1.2 Safety Plan	1.3 Sampling Plan	1.4 Work Plan	2.1 Locate Wells	2.2 Install Wells	2.3 Sample Wells	Remedial Invest Report	Project Management	TOTAL
LABOR (HOURS)											
P4		0	0	0	0	0	0	0	0	0	0
P3		0	0	0	8	0	0	0	0	20	28
P2		0	0	0	0	0	0	0	0	0	0
P1		0	0	0	0	0	0	0	0	0	0
T2		0	0	0	0	0	0	0	0	0	0
T1		0	0	0	0	0	0	0	0	0	0
0		0	0	0	8	0	0	0	0	80	88
TOTAL HOURS LABOR		0	0	0	16	0	0	0	0	100	116
DIRECT LABOR COST	1985 RATE										
P4	26.39	0	0	0	0	0	0	0	0	0	0
P3	22.67	0	0	0	181	0	0	0	0	453	635
P2	17.08	0	0	0	0	0	0	0	0	0	0
P1	13.75	0	0	0	0	0	0	0	0	0	0
T2	12.34	0	0	0	0	0	0	0	0	0	0
T1	10.44	0	0	0	0	0	0	0	0	0	0
0	9.80	0	0	0	78	0	0	0	0	784	862
TOTAL DIRECT LABOR COST		0	0	0	260	0	0	0	0	1237	1497
OVERHEAD (25%)	0.25	0	0	0	65	0	0	0	0	309	374
G & A OVERHEAD (80%)	0.80	0	0	0	208	0	0	0	0	990	1198
TOTAL LABOR COST		0	0	0	533	0	0	0	0	2537	3069
EXPENSE ITEMS											
TRANSPORTATION		0	0	0	0	0	0	0	0	0	0
SUBSISTENCE		0	0	0	0	0	0	0	0	0	0
TOTAL EXPENSE COST		0	0	0	0	0	0	0	0	0	0
SUBTOTAL LABOR AND EXPENSES		0	0	0	533	0	0	0	0	2537	3069
SUBCONTRACTS											
A/E CONSULTANTS		0	538	1089	6706	1182	239617	36183	4289	5070	294674
TOTAL SUBCONTRACTS		0	538	1089	6706	1182	239617	36183	4289	5070	294674
FEE											
LABOR & EXPENSES	0.08	0	0	0	43	0	0	0	0	203	246
SUBCONTRACTS	0.05	0	27	54	335	59	11981	1809	214	253	14734
TOTAL FEE		0	27	54	378	59	11981	1809	214	456	14979
TOTAL SUBTASK COST		0	565	1143	7616	1241	251598	37992	4503	8063	312722

Table 7
BARR ESTIMATED PROJECT COST SUMMARY
Reilly Tar Site

TASK		1.0 - Investigation Support/ Work Plan Preparation				2.0 - Groundwater Contamination Investigation			3.0	4.0	
SUBTASK		1.1 QAPP	1.2 Safety Plan	1.3 Sampling Plan	1.4 Work Plan	2.1 Locate Wells	2.2 Install Wells	2.3 Sample Wells	Remedial Invest Report	Project Management	TOTAL
LABOR (HOURS)											
P4		0	1	4	40	0	0	0	8	24	77
P3		0	4	0	40	8	36	20	24	40	172
P2		0	0	16	40	8	220	260	40	24	608
P1		0	8	0	0	16	320	260	0	0	604
T2		0	0	4	0	0	320	240	16	8	588
T1		0	0	0	8	2	0	0	0	0	10
0		0	2	4	8	2	12	16	16	16	76
TOTAL HOURS LABOR		0	15	28	136	36	908	796	104	112	2135
DIRECT LABOR COST	1985 RATE										
P4	32.00	0	32	128	1280	0	0	0	256	768	2464
P3	22.13	0	89	0	885	177	797	443	531	885	3806
P2	16.00	0	0	256	640	128	3520	4160	640	384	9728
P1	11.89	0	95	0	0	190	3805	3091	0	0	7182
T2	12.04	0	0	48	0	0	3853	2890	193	96	7080
T1	8.09	0	0	0	65	16	0	0	0	0	81
0	8.87	0	18	35	71	18	106	142	142	142	674
TOTAL DIRECT LABOR COST		0	233	468	2941	529	12081	10726	1762	2275	31014
OVERHEAD (25%)	0.25	0	58	117	735	132	3020	2681	440	569	7754
G & A OVERHEAD (80%)	0.80	0	187	374	2353	423	9665	8580	1409	1820	24812
TOTAL LABOR COST		0	478	959	6029	1085	24765	21987	3611	4665	63580
EXPENSE ITEMS											
TRANSPORTATION		0	0	0	30	10	100	100	10	0	250
SUPPLIES		0	0	0	0	0	530	525	0	0	1055
EQUIPMENT RENTAL		0	0	0	0	0	3000	6390	0	0	9390
SHIPPING		0	0	0	50	0	0	4500	50	0	4600
PRINTING		0	20	50	100	0	0	0	300	30	500
TOTAL EXPENSE COST		0	20	50	180	10	3630	11515	360	30	15795
SUBTOTAL LABOR AND EXPENSES		0	498	1009	6209	1095	28395	33502	3971	4695	79375
SUBCONTRACTS											
A/E CONSULTANTS		0	0	0	0	0	0	0	0	0	0
LABORATORY		0	0	0	0	0	0	0	0	0	0
DRILLING		0	0	0	0	0	199000	0	0	0	199000
TOTAL SUBCONTRACTS		0	0	0	0	0	199000	0	0	0	199000
FEE											
LABOR & EXPENSES	0.08	0	40	81	497	88	2272	2680	318	376	6350
SUBCONTRACTS	0.05	0	0	0	0	0	9950	0	0	0	9950
TOTAL FEE		0	40	81	497	88	12222	2680	318	376	16300
TOTAL SUBTASK COST		0	538	1089	6706	1182	239617	36183	4289	5070	294675

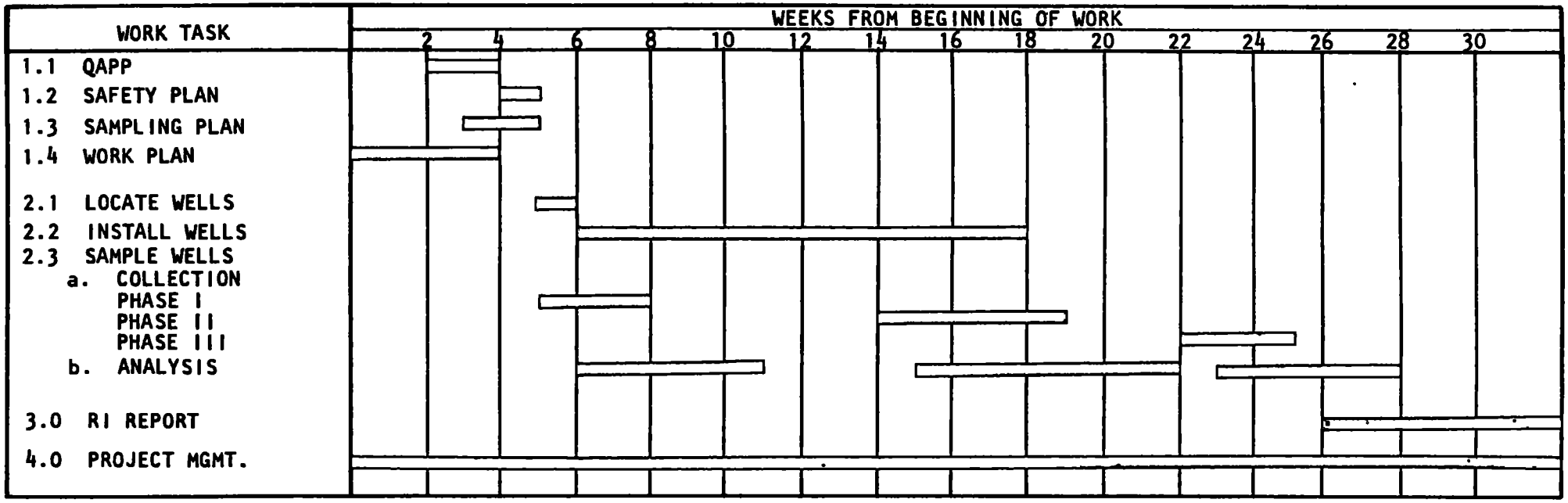


FIGURE 7
PROJECT SCHEDULE
REILLY TAR SITE